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EXAMINER	
LARKIN, DANIEL SEAN	
ART UNIT	**PAPER NUMBER**
2856	

DATE MAILED: 06/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)
	10/616,142	TUDOR, ROBIN
	Examiner	Art Unit
	Daniel S. Larkin	2856

-- The MAILING DATE of this communication appears on th cover sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-10 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-10 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 08 July 2003 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Canada on 09 July 2002. It is noted, however, that applicant has not filed a certified copy of the Canadian application as required by 35 U.S.C. 119(b).

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "placement of a flow meter at a point in the flow stream after particulates are added to the fluid stream", as recited in claim 4 and in combination with all of the limitations of claims 1 and 2, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement

sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:

Page 3, line 8: The term "by" should be corrected to read -- be --.

Page 6, line 9: Should both occurrence of the term "pumper" be corrected to read -- pump -- as shown in Figure 1?

Page 6, line 10: The phrase -- a high -- should be inserted prior to the second occurrence of the term "pressure".

Page 7, line 21: The designation "FIG. 2" should be corrected to read -- FIGS. 1 and 2 -- since the "digital signal processor 52" is also shown in Figure 1.

Page 8, lines 12 and 27: Reference numeral "20" should be corrected to read -- 30 --. Appropriate correction is required.

Claim Objections

4. Claims 5 and 6 are objected to because of the following informalities:

Re claims 5 and 6, claim line 1: The phrase "of any" should be deleted.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,441,340 (Cedillo et al.) in view of US 3,906,780 (Baldwin).

With respect to the limitations of claim 1, the reference to Cedillo et al. discloses a method for controlling the density of a well fracturing slurry. With specific reference to Figure 3, the reference to Cedillo et al. discloses measuring the rate of flow of a fluid stream (30); determining the rate of particulate flow (80); and calculating the density of slurry within a discharge line using a densiometer (65). The reference to Cedillo et al. fails to disclose using an acoustic sensor to determine the rate of particulate flow and the concentration of particulates in the fluid stream.

The reference to Baldwin discloses a particulate material detection means for detecting the presence of particulate material, e.g. sand, in a fluid stream flowing through a conduit. The reference discloses the presence of an acoustical means (12) positioned on the outer surface of the conduit. The acoustical means (12) is excited by

the particulate material striking the interior conduit walls which causes the acoustical means to generate an output signal representative of the particulate material. Modifying the teachings of Cedillo et al. by providing an acoustic source to determine the concentration of particulate matter within the fluid stream would have been obvious to one of ordinary skill in the art because the acoustical means has a primary resonant frequency in one of its modes in excess of the 100 kilohertz range, thereby providing a proper response characteristic necessary for the detection of particulate material.

With respect to the limitation of claim 2, the reference to Cedillo et al. discloses a flow meter (30) for measuring the rate of flow of the fluid stream.

With respect to the limitation of claim 3, the reference to Figure 3 of Cedillo et al. shows the placement of a flow meter (30) in the fluid line prior to the addition of particulate material to the fluid stream.

With respect to the limitation of claim 4, the reference to Figure 3 of Cedillo et al. shows the placement of a flow meter (80) in the fluid line after the addition of particulate material to the fluid stream.

With respect to the limitation of claim 5, the reference to Cedillo et al. fails to show the placement of the acoustical source at a location in the fluid stream where the fluid stream is forced to change directions. The reference to Baldwin discloses that the acoustical source (12) is placed at a location along the fluid stream where the fluid stream is forced to change directions, as shown in Figure 1. Placing the acoustical source at a location where the flow stream changes direction would have been obvious to one ordinary skill in the art given that the acoustical source measures the amount of

particulate material based on the fact that the particulates contact the interior wall of the conduit (10) which in turn excites the acoustic source. Additionally, changing the direction of the flow stream presents a greater opportunity for the particulates to contact the inner wall surface which provides an easier means of detection for the acoustic source to calculate the amount of particulates in the flow stream.

With respect to the limitation of claim 6, the reference to Cedillo et al. fails to disclose filtering of the signal between the determining step and the calculating step. The reference to Baldwin discloses that the acoustical source is tuned to a specific frequency; however, the reference also disclose that the signals collected are passed through a high band pass filter to ensure the frequencies measured are dependent only on particulates in the flow stream. Providing filtering means would have been obvious to one of ordinary skill in the art in order to ensure that background noise generated by normal flow, pump noise, and other extraneous noises striking the conduit or acoustic source housing do not contaminate the signal generated by particulates, thus creating a more accurate representative of particulate concentration.

With respect to the limitations of claim 7, the reference to Cedillo et al. discloses a method for controlling the density of a well fracturing slurry. With specific reference to Figure 3, the reference to Cedillo et al. discloses a fluid flow meter (30) to measure the rate of flow of a fluid stream; means (80) to measure the rate of particulate flow; and calculating means (100) for determining the density of slurry within a discharge line using a densiometer (65), and the fluid flow meter (30). The reference to Cedillo et al. fails to disclose using an acoustic sensor located outside the fluid line near a bend in

the fluid line for determining the rate of particulate flow and the concentration of particulates in the fluid stream.

The reference to Baldwin discloses a particulate material detection means for detecting the presence of particulate material, e.g. sand, in a fluid stream flowing through a conduit. The reference discloses the presence of an acoustical means (12) positioned on the outer surface of the conduit near a bend in the conduit, see Figure 1. The acoustical means (12) is excited by the particulate material striking the interior conduit walls which causes the acoustical means to generate an output signal representative of the particulate material. Modifying the teachings of Cedillo et al. by providing an acoustic source to determine the concentration of particulate matter within the fluid stream would have been obvious to one of ordinary skill in the art because the acoustical means has a primary resonant frequency in one of its modes in excess of the 100 kilohertz range, thereby providing a proper response characteristic necessary for the detection of particulate material. Additionally, placing the sensor near a bend would have been obvious to one or ordinary skill in the art because a bend presents a greater opportunity for the particulates to contact the inner wall surface which provides an easier means of detection for the acoustic source to calculate the amount of particulates in the flow stream.

With respect to the limitations of claim 9, the reference to Cedillo et al. discloses a method for controlling the density of a well fracturing slurry that is injected into a well, which utilizes a clean fluid line (60) leading to a blender (50), the blender (50) mixing a particulate (20) with a clean fluid/water to create a slurry, a slurry line (70) from the

blender (50) to a wellhead through a pumping action, col. 2, lines 46-49. With specific reference to Figure 3, the reference to Cedillo et al. additionally discloses a fluid flow meter (30) affixed within the clean fluid line (60) for measuring the rate of flow of a fluid stream; means (80) to measure the rate of particulate flow; and calculating means (100) for determining the density of slurry within a discharge line using a densiometer (65), and the fluid flow meter (30). Although the reference to Cedillo et al. fails to expressly disclose a high-pressure pump, the examiner argues that Cedillo et al. inherently teaches this feature in view of the fact that Cedillo et al. teaches a functionally equivalent manner of pumping a slurry to a well. The reference to Cedillo et al. fails to disclose using an acoustic sensor located outside the fluid line near a bend in the fluid line for determining the rate of particulate flow and the concentration of particulates in the fluid stream.

The reference to Baldwin discloses a particulate material detection means for detecting the presence of particulate material, e.g. sand, in a fluid stream flowing through a conduit. The reference discloses the presence of an acoustical means (12) positioned on the outer surface of the conduit near a bend in the conduit, see Figure 1. The acoustical means (12) is excited by the particulate material striking the interior conduit walls which causes the acoustical means to generate an output signal representative of the particulate material. Modifying the teachings of Cedillo et al. by providing an acoustic source to determine the concentration of particulate matter within the fluid stream would have been obvious to one of ordinary skill in the art because the acoustical means has a primary resonant frequency in one of its modes in excess of the

100 kilohertz range, thereby providing a proper response characteristic necessary for the detection of particulate material. Additionally, placing the sensor near a bend would have been obvious to one or ordinary skill in the art because a bend presents a greater opportunity for the particulates to contact the inner wall surface which provides an easier means of detection for the acoustic source to calculate the amount of particulates in the flow stream.

7. Claims 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,441,340 (Cedillo et al.) in view of US 3,906,780 (Baldwin) as applied to claims 7 and 9 above, and further in view of US 6,118,104 (Berkcan et al.)

The references to Cedillo et al. and Baldwin both fail to disclose the use of a digital signal processor for reducing noise detected by the acoustic sensor. The reference to Berkcan et al. discloses a method of determining the boil states of a liquid as measured by an acoustic sensor which measures the acoustic signal generated by the liquid as it is heated. The frequency of the acoustic signal is measured. The reference discloses a digital signal processor (DSP) 812 which may be programmed to detect desired frequency ranges, in effect filtering out undesired frequency ranges. Providing a digital signal processor would have been obvious to one of ordinary skill in the art as a means of reducing complexity of the invention by combining a processor with filtering means which eliminates additional structure in the invention.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel S. Larkin whose telephone number is 571-272-2198. The examiner can normally be reached on 8:00 AM - 5:00 PM Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Daniel Larkin
AU 2856
18 June 2004

DANIEL S. LARKIN
PRIMARY EXAMINER